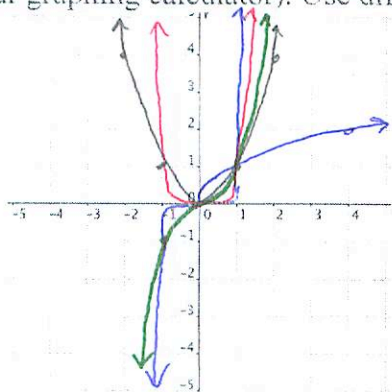


IW #8

1. The function $f(x) = x^n$ is called a *power function*.

a. On the same axes below, sketch the power functions for $n = 2, 3, 4, 5$ (feel free to use Geogebra and/or your graphing calculator). Use different colors for each.

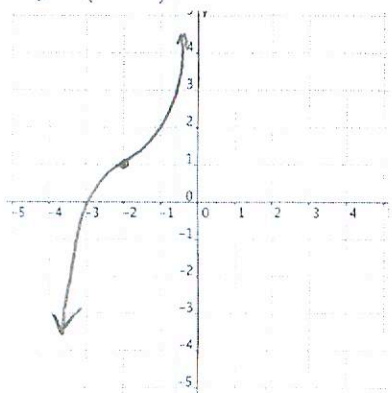


b. What two coordinates do all power functions share?

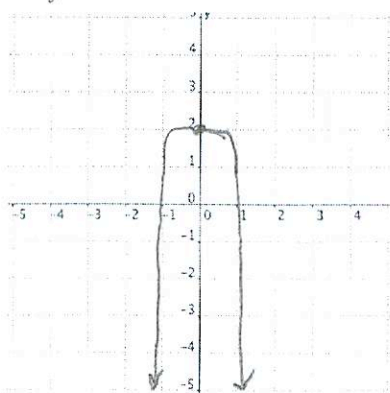
$(0,0)$ $(1,1)$

c. Use your knowledge of transformations along with your understanding of power functions to sketch graphs of the following without the aid of technology.

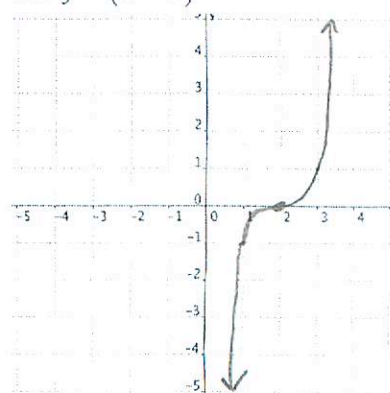
i. $y = (x+2)^3 + 1$



ii. $y = -x^6 + 2$



iii. $y = (x-2)^7$

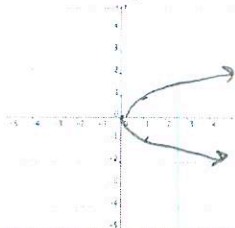


2. The function $g(x) = \sqrt{x}$ can be thought of two ways.

a. Graph the power function $f(x) = x^n$ for $n = \frac{1}{2}$ along with the other power function on the same axes above. See the connection?

Cool! Same coordinates.

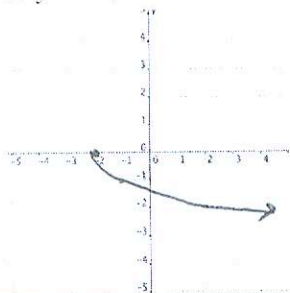
b. Sketch the parabola $x = y^2$ on the axes below. Compare it to the graph from part a. See the connection?



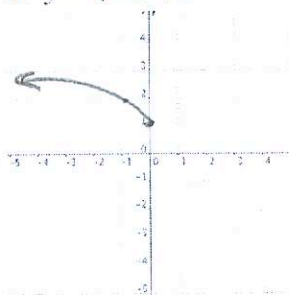
Neat!

c. Use your knowledge of transformations and the graph of the parent function $f(x) = \sqrt{x}$ to sketch graphs of the following without the aid of technology.

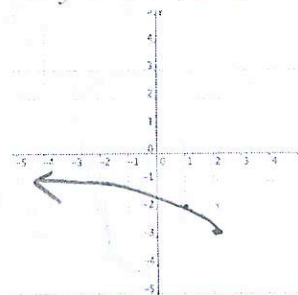
i. $y = -\sqrt{x+2}$



ii. $y = \sqrt{-x+1}$



iii. $y = -3 + \sqrt{2-x}$



3. The *greatest integer function* is sometimes written as $f(x) = \lfloor x \rfloor$. You can find it on your calculator by going MATH-NUM-int(. For example, to evaluate $\lfloor 2.3 \rfloor$, you enter int(2.3) on your calculator.

a. Use your calculator to find the following:

i. $\lfloor 2.3 \rfloor$

2

ii. $\lfloor -2.3 \rfloor$

-3

iii. $\lfloor 7 \rfloor$

7

iv. $\lfloor 0 \rfloor$

0

v. $\lfloor 6\frac{1}{3} \rfloor$

6

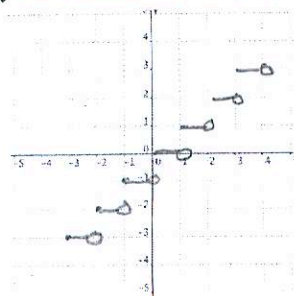
vi. $\lfloor -\pi \rfloor$

-4

b. Based on your answers from part a, explain the *greatest integer function* in words.

Outputs the largest integer \leq the input.

c. Use your calculator to graph $y = \lfloor x \rfloor$. Why do you think it's sometimes called the *staircase function*?

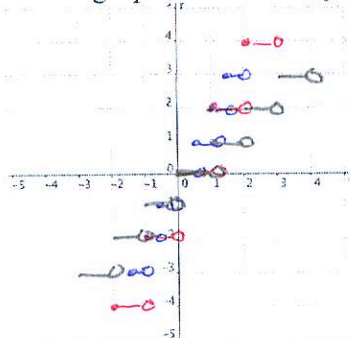


Looks like stairs!

d. The *greatest integer function* in Geogebra is called floor(x). Why do you think it's called this?

It is the integer just below (or equal to) the number.

e. Compare the graph of $y = \text{floor}(x)$, $y = 2\text{floor}(x)$, and $y = \text{floor}(2x)$ in Geogebra. Use different colors. How do these graphs connect to your understanding of transformations?



vertical
dilation
 $\times 2$

horizontal dilation
 $\times \frac{1}{2}$